

SINGLE FAMILY HOME GRADING AND DRAINAGE PLAN CRITERIA

This explanation was prepared based on the City of Tempe Engineering Design Criteria Manual, latest edition, to guide homeowners that are planning to install **pools**, new additions or any construction that will change the existing lot grading/retention. As noted in the manual, the criteria in that document apply to all new and redevelopment building projects where there are site modifications that **affect grading and drainage features** and/or if the floor area is increased by at least 25%. A plan will also be required in order to show that grading & drainage has been properly maintained. Contact engineering personnel in **Development Services @ 480-350-8341 option #2** for additional information or to verify your lot retention requirements.

New additions to homes must be evaluated to determine if the above criteria are met. The square footage of the new addition must be compared to the total square footage of all existing structures located on the lot, including the existing home, porches, garage, accessory building, etc. If the square footage of the new addition exceeds 25% of the total square footage of the existing structures, the homeowner is required to submit a grading and drainage plan that provides on-lot retention for the 100-year storm event. The following summarizes information from the Manual to assist the homeowner in preparation of the grading and drainage plan. Note that the Grading & Drainage Plan must be submitted **in addition to** the building plans for the new structure.

MINIMUM PLAN REQUIREMENTS:

1. Include a complete legal description of the property as it appears on the deed.
2. Include a vicinity map showing the property in relation to that of the major streets.
3. Include a north arrow (pointing to right or top edge of sheet).
4. Include the owner's name or names as it appears on the deed (property, business, developer, etc.) and mailing addresses.
5. Include name, address and phone number of person to whom plans should be returned.
6. Include legal address of property and parcel number.
7. Show all lot dimensions, widths of easements, and rights of way.
8. Show and dimension the location of all existing and proposed structures, drainage patterns, proposed spot elevations, and existing topography of the site and adjacent areas.
9. Show the finished floor elevation (minimum of 14" new residential above lot outfall) for the existing home and the proposed addition. Label the lot outfall location & elevation.
10. Show and dimension all topography in City right of way including pavement, curb, gutter, sidewalks, etc. Note type of existing curb and gutter (6" vertical curb, 4" roll curb, or ribbon curb).
11. Distinguish between all existing and proposed construction.
12. Signature block as follows (lower right-hand corner of first sheet):

APPROVAL FOR DRAINAGE ONLY

CITY ENGINEER

DATE

13. Use an engineering scale, 1" = 30' maximum scale.
14. All plans must be on 11" x 17" sheets, minimum.

15. Show net area of site in square feet.
16. Surface retention on-site of the 100 year storm per City of Tempe Drainage Criteria is required. Show calculations on the grading and drainage plan for the retention volume required and the retention volume provided, show high water levels and bottom elevations for retention areas, and 4:1 maximum side slopes for landscaped retention areas.

The two methods for determining retention volume required are:

Per the Design Manual's Drainage Requirements, Section D. 3. a. (Pages 46 -47), the retention volume required shall be calculated with the following formula:

$$V = (D \div 12) A C$$

V = Volume required, (cubic feet)

D = Depth of water required to retain, (2.4 inches for the 100-year, 1-hour storm event)

A = Area (square feet), total area of lot

C = Coefficient for Non-Absorption (0.95)

OR

The City allows the usage of the Drainage Design Manual for Maricopa County (Chapter 3, Rational Method) as an alternative method for determining required retention volume. This method determines the volume based on a 100-year 2-hour storm which has a higher precipitation (D) of 2.7 inches but has different assigned lot non-absorption coefficient (C) values that vary by the size of the lot and the approximate percentage of the lot covered with improvements. For single family lots, Tables 3.2 and 3.3 of the County Method will be interpreted for the following lot non-absorption coefficients:

Lot Non-absorption Coefficient			
Lot Size	20% or Less Lot Coverage	20% to 39% Lot Coverage	40% or More Lot Coverage
6,000 to 12,000 square feet	0.60	0.71	0.82
12,000 to 40,000 square feet	0.53	0.56	0.60
Over 40,000 square feet	0.41	0.47	0.53

17. Per the Design Manual's Drainage Requirements, Section D. 2. a., the maximum allowable depth of water for calculation of retention volume provided for new single family residential lots will be 6 inches given the rounding with landscaping within these areas, even though the plans specify a depth of 8 inches per Ordinance 819.1.
18. Show positive grade breaks at all property and right-of-way lines.
19. Grading and drainage plans for single family residences **may be prepared by the owner**, however, if the grading and drainage plan is prepared by an engineer, surveyor, or architect registered to practice in Arizona, include the registrant's seal, date, and signature.

20. Show the Engineering Private Development (EN) Number and Development Services (DS) Number (assigned during the first review) in the right hand bottom margin on each sheet.
21. Provide title block on each sheet showing project name, type of drawing (grading and drainage plan) and sheet numbers.
22. Plans are accepted for six (6) months following approval date. One 6 month extension is allowed and after 12 months, the approval expires if permits have not been picked up and paid for.
23. Include, on the Grading & Drainage Plan, the applicable City of Tempe notes for "Site Plans" from the Design Manual (Pages 63 – 64), which are included below.
24. The lot grading plan should include the cross sections shown on page four of this document or similar cross sections through the property. Indicate on the cross sections the type of curb and also the elevation difference between the finished floor & lot outfall.

SITE PLAN NOTES

1. This set of plans has been reviewed for compliance with City requirements prior to issuance of construction permits. However, such review shall not prevent the City from requiring correction of errors in plans found to be in violation of any law or ordinance.
2. The City does not warrant any quantities shown on these plans.
3. The City approval is for on-site grading, drainage. This approval is valid for a period of six months. Construction permits shall be obtained during this period or the plans shall be resubmitted for review and approval. One 6 month extension may be granted, upon request, after which the approval will expire.
4. An approved set of plans shall be available on the job site at all times.
5. Call the engineering inspection request line at (480) 350-8475 at least one business day before construction to request inspection of grading and drainage. Construction work concealed without inspection by the City shall be subject to exposure at the contractor's expense.
6. The homeowners shall contact BLUE STAKE (602-263-1100) 48 hours prior to construction.
7. All broken or displaced existing concrete curb, gutter, or sidewalk shall be removed and replaced as directed by the City of Tempe Engineering Division inspector.

